

near relationship to the Racoons, especially the Kin-kajou; and his opinions were more than borne out by the contemporary investigations of Sir W. H. Flower into its internal anatomy. The public, too, will be much interested to learn that Bartlett was a firm believer in the existence of a "sea-serpent," although whether they will be inclined to share his opinion that there are reptiles that can live for months at a time at the bottom of the ocean without coming up to breathe may be questioned.

But much as these and many other portions of the book may interest and attract the general reader (not to mention the scientific naturalist), there are other parts for which such commendation can scarcely be claimed. We have, for instance, several descriptions of species, such as that of the white-whiskered Lemur (*L. leucomystax*) on p. 22, and Monteiro's Galago (*G. monteiroi*) on p. 24, which can be of no possible interest to any one but a specialist, especially in the absence of figures. But this is not all, as the aforesaid Lemur is now regarded by qualified naturalists merely as the female of (*L. macaco*), and its retention as a species is consequently a mere misleading of the public.

If this were the sole instance of a want of efficient editorship it might, indeed, well have been passed over in silence, but unfortunately it is only one among many. For instance, on the very first page of the volume we have a repetition of the old story that the Apes seen by Hanno, the Carthaginian, were Gorillas (in the modern sense of that term), whereas it has been shown over and over again that such could not have been the case; Mr. Winwood Reade believing the creatures to have been Baboons, while Sir Harry Johnstone thinks they were more probably Chimpanzees. Neither is it a true statement that the skull of the Gorilla obtained by Dr. Savage at the Gaboon was ever sent to Owen, who only received sketches of the same; the specimen itself having apparently gone to America. It is quite true that these statements were made by the author of the papers which constitute this volume, but it was for the editor to have made the necessary amendments.

Then, again, we have to deplore a lack of efficient editorship in the manner in which the different sections of the book are introduced, or rather not introduced. For example, who would guess that the dissertation on hybrid bovine animals, commencing on p. 71, is reproduced, with the exception of the opening sentence, word for word from the *Proceedings* of the Zoological Society for 1884? And if the quotation is not acknowledged as such by the usual marks in this place, why are such marks introduced in another equally long quotation from the same serial on p. 6? Neither is there any indication to show that the portrait of the Chimpanzee "Sally" on p. 7, as well as the picture of hybrid Cattle on p. 70, are copied from plates in the Zoological Society's *Proceedings*. And very indifferent copies at that, the reader will probably add! Indeed, the illustrations generally are far from being a strong point of the book, while, like the regiments in the British army, there are too few of them.

Neither can we avoid saying that the nomenclature is hopelessly out of date; this being sufficiently apparent

when we mention that *Trogodytes* is given as the generic name of the Chimpanzee and Gorilla, *Ceriornis* for the Tragopan, and *Felis* for the Hunting Leopard or Chita! If popular writers will not keep somewhat in touch with the systematic work of the day, it is their fault if they are treated with contempt by professional naturalists.

In spite of the errors and imperfections to which we have called attention, we, as already said, fully recognise the large amount of interesting matter in the volume before us; and if our readers desire a really amusing story, we may refer them to the adventure of Mr. and Mrs. Jamrach with the Lions. At the same time, we think that the editor would have been much better advised had he reduced the present volume and its companion to the limits now occupied by one of them.

R. L.

ELECTRICAL OSCILLATIONS.

Recherches Expérimentales sur les Oscillations Électriques. Par A. Turpain. Pp. 154. (Paris: Librairie Scientifique, A. Hermann, 1899.)

THE classical researches of Hertz on electromagnetic waves have opened up a new field of experimental research, which has already yielded a rich harvest of results. As regards the literature of the subject, we have, besides Hertz's original papers, two or three other works dealing with the theory and phenomena of electromagnetic waves. Dr. Lodge's little book contains a general and easily intelligible sketch of the whole subject. In Prof. J. J. Thomson's "Recent Researches" we have an elaborate exposition of theory, along with an account of the experimental development of the subject down to the date of publication. Poincaré's "Oscillations Électriques" is probably the best-known Continental work on electromagnetic waves.

The work before us is one which does not trench on the ground already covered by the above-named treatises. It is a record of original researches, some of which have already appeared in various scientific periodicals. The scope of these researches is limited to the propagation of waves along conductors.

After a brief introduction, the author gives us in Chapter i. a full and clearly illustrated description of the experimental arrangements used by him, including the various forms of oscillators, resonators and their micrometers, and methods of concentrating the electromagnetic field between wires or plates.

Chapter ii. deals with the methods of measurement. Besides the classical method of determining the sparking distance by means of a micrometer observed either with the naked eye or by the aid of a lens, the author used a resonator with an additional air-gap which was bridged by a battery and telephone receiver. Every time sparks passed across the micrometer-gap, the circuit of the battery and telephone was completed. This method of investigation—which, however, requires very careful adjustment—the author found less fatiguing than that in which the eye is unduly strained in trying to detect the presence of minute sparks.

Chapter iii. describes the methods adopted for adjusting the length of the wires so as to get a sharp division into nodal and ventral segments. This is followed by an

account of the various positions in which the resonator was placed; of the results obtained with an ordinary Hertzian field between two wires, and round a single wire. The author next considers the *interference* field, which is obtained between two wires whose ends are connected to plates placed on opposite sides of the *same* plate of an oscillator. The effects on an ordinary 2-wire field of bending one of the wires so as to lengthen it by $\frac{1}{4}$, $\frac{1}{2}$ and a whole wave-length are next investigated. The author shows that all the effects obtained may be deduced from the results obtained with a single-wire field. An account of some experiments with 3, 4 and 6 wires concludes this chapter.

Chapter iv. deals with the action of the resonator. The effects of varying the position and direction of the micrometer-gap, the disturbance due to the presence of the resonator in the field, and the effect of varying the length of the resonator are studied in detail. The form of resonator with a gap bridged over by a cell and telephone receives careful attention, the effect of altering the position of the gap relatively to the micrometer spark-gap being fully investigated.

Chapter v. is concerned with the important problem of the propagation of waves in dielectrics other than air. Oil and water were the two dielectrics studied by the author, and the effects obtained clear up some rather obscure and apparently contradictory results obtained by other experimenters in this field.

Chapter vi. contains a useful *résumé* of the more important results obtained by the author.

In Chapter vii. the author describes a system of multiplex Hertzian wave telegraphy (*not* wireless), regarding whose practical value we may well be pardoned for feeling somewhat sceptical.

The book forms a valuable storehouse of facts, and the author is to be congratulated on the extremely lucid and well-arranged account of his important researches. They were all carried out on a large scale (in the experiments on oil and water, 230 to 260 litres of the liquid were used), and must have required an unusual amount of skill, care and patience.

A striking feature of the work is the entire absence of mathematical reasoning, not a single symbol of differentiation or integration occurring throughout the whole of the book. The author has carefully avoided all theoretical discussions, and confined himself to an accurate description of experimental facts. The clearness and elegance of the language in which this description is given render it a pleasure to read the book, which will prove a source of delight to every true experimentalist.

OUR BOOK SHELF.

Indicators and Test Papers. By Alfred I. Cohn, Ph.G. Pp. ix + 249. (New York: John Wiley and Sons. London: Chapman and Hall, Ltd., 1899.)

THIS book contains an account of the source, preparation, application and tests for some scores of indicators and test papers which have been proposed for use chiefly in determining the end-point in volumetric chemical analyses. The book opens with a general discussion of the action, use, and theory of indicators, and ends with four useful tables and a good index. The first table is

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Trommsdorff's showing the sensitiveness of indicators to acids and alkalis, the second is R. T. Thomson's (hitherto the chief English guide), the third is Dieterich's table showing the sensitiveness of various test-papers, and the fourth is a tabular summary of the principal indicators by the author.

The compilation of this book must have demanded much patient labour, and acknowledgments are due to the author for the care and pains he has bestowed upon the work. It will prove a useful addition to analytical literature. Whilst saying this, some points of criticism cannot be withheld. In the first place it must be said that the author has not dealt in a very clear way with the theory of indicators. The subject is not an easy one, and the average operator has not hitherto troubled himself much about it. Litmus has been to him a substance provided by Nature for the discrimination between acids and alkalis rather than the means of furnishing blue alkaline salts from which a weakly acidic substance of red tint is "displaced" by the action of nearly all other acids. Again, the reasons why methyl orange is good for the titration of bases and not of acids is not usually inquired into. Such considerations make it the more desirable that the principles underlying the use of indicators should be stated very clearly. Mr. Cohn has given explanations, including the application of the ionic theory, and of the speculative mechanical theory (somewhat antiquated and unfruitful) of F. Mohr, but he has not set forth the matter with the desirable clearness and coherence.

Next with regard to the substance of the book, it is worth considering whether, in any future edition, type of two sizes might not be employed. Many of the indicators described are of extremely doubtful value, and the worker really wants to know definitely which indicators have been found meritorious by other people than those who have suggested their use. In this connection also a protest must be raised against naming indicators after their inventors. It is useful to know the composition and nine synonyms of Tropæolin OO, but there is surely no call to add to these the term "Von Müller's Indicator."

The book would have been improved by references to original papers. For example, the reflecting galvanometer is scheduled as an indicator, but there is neither a full description of its use nor a reference to Küster's paper on the subject. References would have been valuable throughout the book.

A. S.

Optical Activity and Chemical Composition. By Dr. H. Landolt; translated by Dr. J. McCrae. Pp. xi + 158. (London: Whittaker and Co., 1899.)

THIS small book is a remarkably clear exposition of what is a somewhat recondite and difficult branch of chemical physics. It is well known to students of optical science that there are liquids and solid substances in solution which have the strange power of rotating the plane of vibration of a polarised ray of light that is passing through them. Familiar examples are turpentine and other essential oils, sugars, tartaric acid, quinine and albumen. But Dr. Landolt says that more than seven hundred substances, all carbon compounds, are known to exhibit this molecular rotation.

Of course the fruitful discoveries of Pasteur—the right and left-handed tartaric acids, racemic acid, molecular asymmetry, &c., are briefly described; and the more recent simultaneous discoveries of van't Hoff and Le Bel receive fuller attention. It is shown how this property is met with only where one at least of the carbon atoms of an organic compound is united with four different atoms or radicles; and the results flowing from this kind of structure are explained and illustrated—results which form what is now called stereochemistry.

But the principal object of Prof. Landolt's book, as expressed in its title, is the connection that may be found